CO AND CO_2 MEASUREMENTS

§ 1065.250 Nondispersive infrared analyzer.

(a) *Application.* Use a nondispersive infrared (NDIR) analyzer to measure CO and CO_2 concentrations in raw or diluted exhaust for either batch or continuous sampling.

(b) *Component requirements.* We recommend that you use an NDIR analyzer that meets the specifications in Table 1 of §1065.205. Note that your NDIR-based system must meet the calibration and verifications in §§1065.350 and 1065.355 and it must also meet the linearity verification in §1065.307.

[76 FR 57442, Sept. 15, 2011, as amended at 79 FR 23761, Apr. 28, 2014]

HYDROCARBON MEASUREMENTS

§ 1065.260 Flame-ionization detector.

(a) *Application.* Use a flame-ionization detector (FID) analyzer to measure hydrocarbon concentrations in raw or diluted exhaust for either batch or continuous sampling. Determine hydrocarbon concentrations on a carbon number basis of one, C_1. For measuring THC or THCE you must use a FID analyzer. For measuring CH_4 you must meet the requirements of paragraph (f) of this section. See subpart I of this part for special provisions that apply to measuring hydrocarbons when testing with oxygenated fuels.

(b) *Component requirements.* We recommend that you use a FID analyzer that meets the specifications in Table 1 of §1065.205. Note that your FID-based system for measuring THC, THCE, or CH_4 must meet all the verifications for hydrocarbon measurement in subpart D of this part, and it must also meet the linearity verification in §1065.307.

(c) *Heated FID analyzers.* For measuring THC or THCE from compression-ignition engines, two-stroke spark-ignition engines, and four-stroke spark-ignition engines at or below 19 kW, you must use heated FID analyzers that maintain all surfaces that are exposed to emissions at a temperature of (191 ±11) °C.

(d) *FID fuel and burner air.* Use FID fuel and burner air that meet the specifications of §1065.750. Do not allow the FID fuel and burner air to mix before entering the FID analyzer to ensure that the FID analyzer operates with a diffusion flame and not a premixed flame.

(e) *NMHC and NMOG.* For demonstrating compliance with NMHC standards, you may either measure THC and CH_4 and determine NMHC as described in §1065.660(b)(2) or (3), or you may measure THC and determine NMHC mass as described in §1065.660(b)(1). See 40 CFR 1066.635 for methods to demonstrate compliance with NMOG standards for vehicle testing.

(f) *CH_4.* For reporting CH_4 or for demonstrating compliance with CH_4 standards, you may use a FID analyzer with a nonmethane cutter as described in §1065.265 or you may use a GC–FID as described in §1065.267. Determine CH_4 as described in §1065.660(c).

[76 FR 57442, Sept. 15, 2011, as amended at 79 FR 23761, Apr. 28, 2014]

§ 1065.265 Nonmethane cutter.

(a) *Application.* You may use a nonmethane cutter to measure CH_4 with a FID analyzer. A nonmethane cutter oxidizes all nonmethane hydrocarbons to CO_2 and H_2O. You may use a nonmethane cutter for raw or diluted exhaust for batch or continuous sampling.

(b) *System performance.* Determine nonmethane-cutter performance as described in §1065.365 and use the results to calculate CH_4 or NMHC emissions in §1065.660.

(c) *Configuration.* Configure the nonmethane cutter with a bypass line if it is needed for the verification described in §1065.365.

(d) *Optimization.* You may optimize a nonmethane cutter to maximize the penetration of CH_4 and the oxidation of all other hydrocarbons. You may humidify a sample and you may dilute a sample with purified air or oxygen (O_2) upstream of the nonmethane cutter to optimize its performance. You must account for any sample humidification and dilution in emission calculations.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37300, June 30, 2008; 76 FR 57442, Sept. 15, 2011]